
Financial Markets and Bankruptcy Systems: Is there a Relationship?

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Abstract:

Purpose: Filling the cognitive gap in the theory of ex-post transaction costs, i.e., at the stage of enforcing market transactions by examining the relationship between friendliness/severity of the bankruptcy and restructuring law towards debtors, the level of development of financial markets, the effectiveness of the judicial system and the rate of debt recovery.

Design/Methodology/Approach: In the research, the following methods were used: literature review, cluster, and panel analysis.

Findings: Based on the research, the existence of a statistical relationship was proven between the effectiveness of bankruptcy systems (measured by the recovery rate) and factors characterizing the level of development of the financial market as well as the severity of bankruptcy law towards debtors and the effectiveness of the judicial system.

Practical Implications: Research shows that the development of the financial market, and the debt market, in particular, forces countries to put more emphasis on the effectiveness of judicial systems and to create more stringent bankruptcy laws for debtors (more creditor-friendly).

Originality/value: This is the first study of its type. In the next stage of the research, the authors want to additionally include such variables as the type of the legal system (statutory law vs. common law) and its origin, the form of organization of the financial market, and at the same time, the banking system model (the Anglo-Saxon and continental models), the effectiveness of conducted restructuring measures, the level of development of countries.

Keywords: Bankruptcy, law and economics, institutional economics, financial markets.

JEL classification: G33, K22, E44, G15.

Paper Type: Research study.

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1. Introduction

The socio-economic changes taking place in the world, the ongoing processes of globalization, digitization, and financialization and the accompanying uncertainty, the discontinuity of economic processes, increase the risk of economic insolvency and, consequently, the risk of legal bankruptcy of companies. Globalization and the associated capital flows give rise to new challenges but also research difficulties.

On the one hand, the effective functioning of legal bankruptcy systems determines the development and strength of financial markets; on the other hand, financial markets force legislators to create bankruptcy law conducive to its development and institutions responsible for the effective enforcement of this law. Investors and other stakeholders in the financial market expect bankruptcy and restructuring proceedings to be transparent and carried out quickly and at relatively low costs. We can, therefore, say that a sort of symbiosis between these elements should exist.

So far, there has not been much research in global literature regarding these relationships directly. The authors attempted to fill this gap. The purpose of the article is, therefore, to examine the relationship between friendliness/severity of the bankruptcy and restructuring law towards the debtors (BLSI - bankruptcy law severity index), which is to reflect the approach of individual countries to creating such law, the level of development of financial markets, the effectiveness of the judicial system and the recovery rate reflecting the effectiveness of bankruptcy systems. The following research hypothesis was examined:

H: There is a statistical relationship between the effectiveness of bankruptcy systems (measured by the recovery rate) and factors describing the level of financial market development and the severity of bankruptcy law towards debtors and the judicial system's effectiveness.

The analysis was conducted for a sample of 23 European countries plus Canada, Australia, and the USA. Panel analysis models were used for data expressed in nominal and standardized values, based on which appropriate conclusions were drawn regarding the level of significance of individual factors included in the analysis. The data used in the models concerned the legal (BLSI and Judicial Effectiveness) and economic situation (value of domestic credit to the private sector as % of GDP; stock market capitalization to GDP and value of debt instruments issued by the financial and non-financial sector to GDP) for the countries analysed.

The article consists of three parts. In the first one, we reviewed the literature regarding the analysis of bankruptcy law and factors influencing bankruptcy systems' effectiveness. In the next part, we described in detail the econometric model used to verify the hypothesis. The final part contains the study's conclusions, with an indication of its limitations and further directions of academic exploration.

2. Literature Review

The issue of the rights and obligations of debtors and creditors in bankruptcy and restructuring law has been widely researched in the literature. Among other issues, the researchers examine the relationship between legal regulations and the level of recovery rate for creditors, willingness to innovate, or develop entrepreneurship. Thus, Tarantino (2013) stated in the article that soft bankruptcy law could reinforce debtors' rights to renegotiate their outstanding liabilities and encourage investments with long-term effects. As a result, the creditors do not want to open the debtor's liquidation procedure to recover their outstanding claims, as they count on a higher recovery rate. Interesting conclusions were also reached by Acharya and Subramanian (2009), who stated that creditor-friendly bankruptcy law, leading to the liquidation of debtor companies in companies with third-party debt financing, results in avoiding innovation by such companies. When bankruptcy law is debtor-friendly, these companies are seemingly more willing to innovate. The issues of bankruptcy law and attitudes towards debtors were also examined by Davydenko and Franks (2008), who noted in their article that bankruptcy law could have a two-fold impact on creditors' behavior.

Firstly, the level of creditor protection has a major impact on their approach to providing financing. It, therefore, directly affects its availability. In the case of debtor-friendly bankruptcy law, creditors can and often demand additional collateral, limiting the availability of financing. Based on a survey of 586 French companies, they proved that where bankruptcy law favors debtors, banks require additional collateral. An important research trend in the literature is looking for relationships between entrepreneurship measures, innovation, enterprise performance, and the type of bankruptcy regime. Based on research carried out in 4 countries (France, Germany, Spain, United Kingdom), López Gutiérrez, Garcia Olalla, and Torre Olmo (2011) concluded that countries with creditor-friendly bankruptcy regimes, companies filing for bankruptcy lose more value than in countries with debtor-friendly orientation. The issue of collateral and related rights is also relevant and has been investigated by, e.g., Haselmann, Pistor, and Vig (2010), who noted that banks grant higher loans in systems where collateral law protects creditors.

The characteristics of bankruptcy law were examined in terms of its various aspects, ultimately affecting the recovery rate. One important study is the publication by Hart (2006), who carried out an extensive analysis of bankruptcy law's attractiveness. It explains that bankruptcy procedures should maximize the debtor's assets, which are ultimately distributed among the creditors. In another study, Blazy, Chopard, and Nigam (2013) noted that the amounts recovered by creditors increase with the availability of bankruptcy proceedings, the level of protection of the company's assets, and, importantly, with sanctions for incompetent managers. An interesting study was also carried out by Lopez-Gutierrez, Olmo, and Sanfilippo-Azofra (2011), who examined the bankruptcy law changes in various countries and concluded that it is not appropriate to look at bankruptcy law by analyzing whether it is fully effective. What is important is that the measures it establishes must be genuinely useful for

achieving the proposed goals. The article by Sundgren (1998) presents empirical evidence on issues related to the role of restructuring. The results show that creditors obtain better repayment in the event of restructuring than in the sale of a business operating in a liquidation bankruptcy. Other authors (Lee *et al.*, 2011) concluded based on research conducted in 29 countries in the period 1990-2008 that there is a positive correlation between the friendliness of bankruptcy law towards entrepreneurs and the level of entrepreneurship measured by the entry rate of new companies into the market (Thalassinos and Stamatopoulos, 2015).

An important part of the literature regarding the subject is the analysis of the relationship between bankruptcy proceedings' effectiveness and various factors. Smrčka, Arltová carried out such a study, and Schönfeld (2017), who analysed the relationship between bankruptcy proceedings' effectiveness in individual countries and the countries' overall level of development of the countries included in the study. Employing regression, was proved that the quality of the legal environment measured by the effectiveness of bankruptcy processes is indeed related to the economy's overall efficiency.

The research to date in some of the areas outlined above is not consistent and needs to be continued further. In this article, our goal is to fill the research gap and verify the relationship between the recovery rate and selected factors characterizing the financial market and an index of the severity of bankruptcy law towards debtors and the effectiveness of judicial systems. In our opinion, an effectively functioning bankruptcy system is an essential element in developing the financial market. Therefore, the financial markets are forcing the legislator and government institutions to improve the system's effectiveness. The main factors responsible for the bankruptcy system's effectiveness are bankruptcy and restructuring law, as well as the effectiveness of the judicial system. The two elements must operate well together.

The article attempts to fill the cognitive gap in the theory of transaction costs ex-post, i.e., at the stage of market transaction enforcement. The notion of transaction costs appeared in the economy in the 1930s, mainly due to Ronald H. Coase. This researcher (Coase, 1937) set out to prove that each transaction in the economy is accompanied by various costs which, when added together, correspond to friction forces in the physical system. Transaction costs occur at the market level (friction of market forces) and the company level, as managerial costs. A literal interpretation of the phrase "transaction costs" suggests that this is a type of cost incurred in preparing, implementing, and enforcing market transactions. About the issue of potential bankruptcy, this can be interpreted as meaning that a more creditor-friendly law can reduce transaction costs associated with financial transactions in which creditors entrust money to the debtor. They can also have an impact on the development of financial markets. This is because the costs of obtaining financing are decreasing. As a result, the claims recovery rate in the bankruptcy procedure may be higher. It can therefore be assumed that the more severe the law is for debtors (creditor-friendly), the higher the effectiveness of the bankruptcy process measured by the recovery rate. Coase's theory is recognized in the literature as the basis for many studies and the

presentation of their results in scientific articles. Transaction cost theory was also applied by other researchers (e.g., Li and Li, 1999) who linked it to agency theory and its impact on bankruptcy and subsequent recovery procedures for creditors.

3. Research Methodology

To achieve the goal of the article and verify the hypothesis formulated in the introduction, countries were selected for the study sample. Most EU countries (Austria, Croatia, Estonia, Finland, Germany, Greece, Italy, Latvia, Lithuania, Sweden, Bulgaria, the Czech Republic, France, Hungary, Italy, Portugal, Romania, Slovakia, Slovenia, Spain, Denmark, the Netherlands, Ireland, and the United Kingdom (apart from small EU countries and countries for which the Authors were unable to obtain information regarding bankruptcy law) as well as the United States, Canada, and Australia were included. The United States is widely considered one of the best bankruptcy laws globally (Jackson and Skeel, 2013, p. 5). Apart from the USA, Australia and Canada were also included in the comparison, i.e., countries that in the Resolving Insolvency ranking (Doing Business 2020 report) are ranked high in terms of the bankruptcy system's quality. In Australia, similarly to the USA and Canada (outside the province of Quebec), common law is the applicable legal system.

The data used in the analysis comes from 2019, only the Judicial Effectiveness index was created based on information from the second half of 2018 and the first half of 2019 (The Heritage Foundation 2019). The necessary information was obtained from the World Bank and The Heritage Foundation (Judicial Effectiveness Index). The Judicial Effectiveness Index is included in the range from 0 to 100, with higher values corresponding to better evaluation of the judicial system's effectiveness. As far as the BLSI is concerned, it was constructed by the co-authors of the study based on an analysis of legal acts in force at the end of 2019. It shows how friendly/severe bankruptcy and restructuring law are for debtors, and its value is between 0 and 1, where:

0 – Debtor-friendly bankruptcy law,

1 – Bankruptcy law severe (unfriendly) towards debtors – creditor-friendly.

This index is the arithmetic mean of the ratings obtained for the individual criteria included in the index. The authors of the index did not decide to weigh the ratings, which could subjectively disturb the comparison. Financial data used in the models, i.e., Domestic credit to the private sector (% of GDP), Stock market capitalization to GDP (%), Total debt securities to GDP (%), come directly from the World Bank World Development Indicators (The World Bank 2020) and the Bank for International Settlements (2020) databases and concern 2019. These are the main measurements showing the development of financial markets, including the debt market.

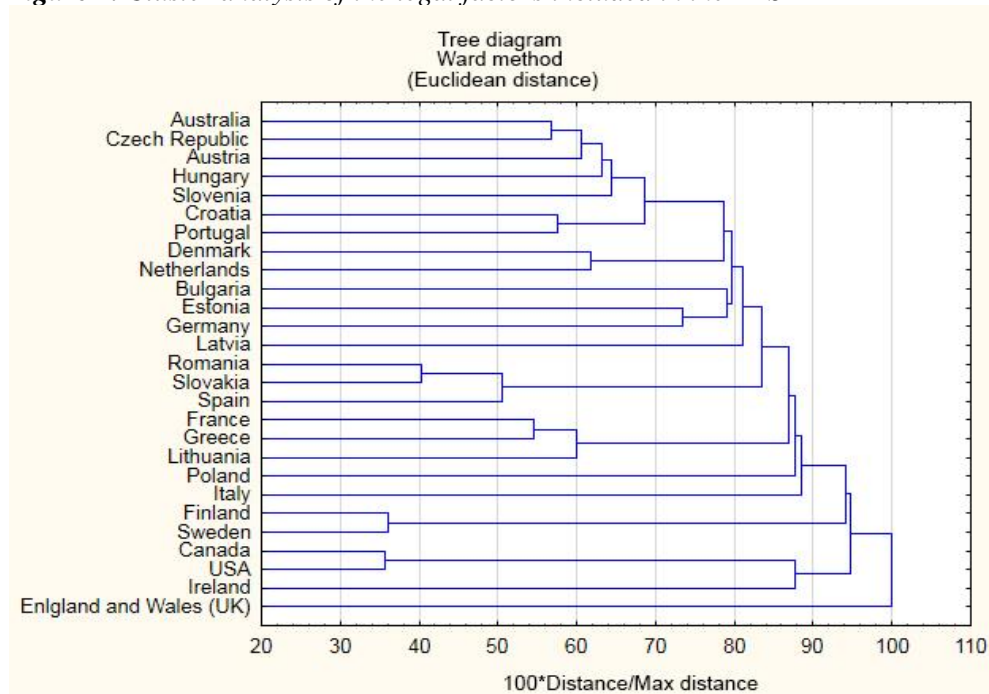
The basic characteristics of the variables used in the model are presented in Table 1.

Table 1. Descriptive statistics of the variables applied in the model

CONTENT	Recovery rate	BLSI	Domestic credit to private sector (% of GDP)	Stock market capitalization to GDP (%)	Total debt securities to GDP (%)	Judicial Effectiveness
Mean value	71.05218741	0.543209877	81.84115	55.75185185	0.610601116	63.00740741
Standard deviation	22.22676233	0.157505207	42.26927	49.70052136	0.608199542	15.31806189
Max	96.68318	0.808333333	192.1635	154	2.032296671	86.1
Min	35.77828	0.175	24.71586	2.7	0.00240974	39.6
Median	79.41471	0.566666667	79.18424	29.8	0.469121185	64.4
Kurtosis	-1.50788026	0.087712903	0.362165	0.982996687	0.15542136	-1.523069769

Source: Own study.

Based on the legal factors used to build the BLSI, standardised in accordance with formula (1) below, a cluster analysis was carried out, with the grouping of countries using the Ward method (Figure 1).

Figure 1. Cluster analysis of the legal factors included in the BLSI

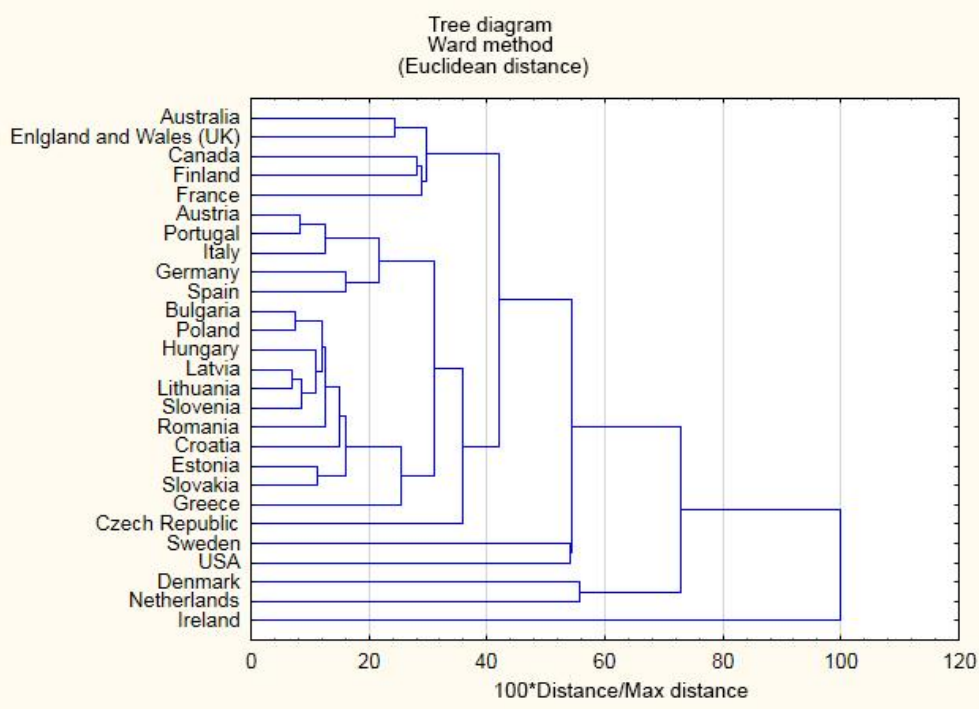
Source: Own study.

Based on cluster analysis conducted for the legal factors included in the BLSI, assuming the maximum Euclidean distance between objects (countries) in clusters at the level of 50, we can distinguish three clusters. The closest country clusters are those involving Canada and the USA (cluster I), Finland and Sweden (cluster II), and

Romania and Slovakia (cluster III). These countries have a similar approach to the shaping of bankruptcy law regarding its severity towards debtors. These are countries with a similar origin of bankruptcy law, similar economic development and at the same time sharing a border (Canada with the USA and Sweden with Finland) or not far apart (Slovakia and Romania).

Given the financial data used in the study (value of domestic credit to the private sector as % of GDP; stock market capitalization to GDP; and value of debt instruments issued by the financial and non-financial sector to GDP), the analysis of the clusters of countries included in the study is presented in Figure 2.

Figure 2. Cluster analysis for financial market data



Source: Own study.

The cluster analysis for financial factors presented in Figure 2 is characterised by much shorter distances than in the case of legal factors. Assuming the maximum distance in clusters between countries at the level of 40, we can distinguish two clusters covering most of the analysed countries and five clusters for individual countries. Seventeen countries (Austria, Portugal, Italy, Germany, Spain, Bulgaria, Poland, Hungary, Latvia, Lithuania, Slovenia, Romania, Croatia, Estonia, Slovakia, Greece, and the Czech Republic) are among the most numerous cluster (I). The second cluster (II) contains five countries (Australia, UK, Canada, Finland, and France). The explanation for the two large clusters identified in the analysis can be found within the data analysed in the Anglo-Saxon (cluster II) and continental (cluster

I) financial systems, which is illustrated by the capitalisation of stock exchanges in individual countries (CEPS, 2020).

The historical background of the schemes can also be seen in the areas of access to finance, costs, and commissions as well as consulting and, in the case of households, the savings rate and the popularity of loans among households (impact on the value of domestic credit to private sector as % of GDP). According to the European Investment Bank and PwC report (Dellannoy *et al.*, 2017), most of the countries in the first cluster (I) are in the group of high or medium priority countries where access to finance and consulting may be difficult, which in turn may have a significant impact on the value of debt instruments issued by the financial and non-financial sector to GDP. In contrast, the European countries of the second cluster (II) were considered in the report as low-priority countries. In these two clusters, the impact of GDP is also clear, which for countries in the second cluster (II) is significantly higher than for the first cluster (I), and the value of GDP is the denominator of the variables used in cluster analysis. The achievement of the objectives of the Union of capital markets, both in equity markets and debt instruments (EC, 2017a; 2017b; Çelik *et al.*, 2020), may also be significant.

Finally, the reasons for similarities between countries may also be due to their geographical location and therefore the movement of capital, goods, and services. According to Invest Europe (2020), in 2019 more than 55% of the capital raised by European Private Equity funds came from Europe, with France having the largest share in the source of capital. All the discussed factors translate into economic development and justify the clusters visible in Figure 2.

To analyse the relationship between the recovery rate and legal and economic factors, two panel regression models were estimated in the article – for data without transformation and for standardized data. The first model is intended to help answer the question of how nominal changes in the values of individual factors affect the recovery rate, while the second is intended to analyse the impact of individual factors and ensure their comparability.

The panel regression models proposed in the article are *pooled* models that do not cause the loss of information. Additionally, these models allow to use the Classical Least Square Method (CLSM) to estimate the parameters of the model, the assumptions of which are fulfilled by our sample, which will result in effective and unbiased estimators.

The data standardization process presented in the second model (II) is based on a quotient transformation. The standardization formula used in the article is presented as formula (1). The proposed transformation does not change the diagonality and kurtosis of the distribution of variables and correlations (Walesiak, 2014), and all analysed variables take values from a closed interval after transformation [0,1].

$$z_{ij} = \frac{x_{ij}}{\max_i \{x_{ij}\}} \quad (1)$$

Before model estimation, the data was analysed for variable distributions using Jarque-Bera test and QQ plots. Based on QQ plots, deviations from normal distribution were found only in the tails of the distributions, however, low values of Jarque-Bera statistics did not induce to reject the hypothesis of normal distribution of all variables.

4. Empirical Results

In accordance with the research methodology presented in item 3, the effects of the analysis are presented below in the form of two models, i.e., for data without transformation (model I) and for standardized data (model II).

The first (I) of the estimated models is as follows (formula 2, brackets are used to indicate the estimation errors).

$$\begin{aligned} &\text{Recovery rate (cents on the dollar)} \\ &= 21.7350 * \text{BLSI INDEX} \\ &\quad (2.047e - 014) \\ &+ 0.0616595 * \text{Domestic credit to private sector (\% of GDP)} \\ &\quad (2.718e - 016) \\ &+ 0.0149909 * \text{Stock market capitalization to GDP (\%)} \\ &\quad (3.737e - 016) \\ &+ 22.8196 * \text{Total debt securities to GDP (\%)} \\ &\quad (1.391e - 014) \\ &+ 0.208024 * \text{Judicial Effectiveness} \quad + 26.3842 \\ &\quad (4.091e - 016) \quad (3.180e - 014) \end{aligned} \quad (2)$$

According to the estimated model, with a 0.1 increase in the BLSI value, the recovery rate will increase by 2.1375 cents (with other factors unchanged), and with a 1 percentage point increase in debt instruments issued relative to GDP, the recovery rate will increase by 0.228196 cents. Individual changes in other variables no longer generate such significant changes in the recovery rate.

The model presented above is convenient for assessing changes in nominal variables and their impact on the recovery rate, but it does not directly compare the impact of independent variables included in the model. Therefore, a second model (II), based on standardized data according to formula (1), was estimated and presented as formula (3).

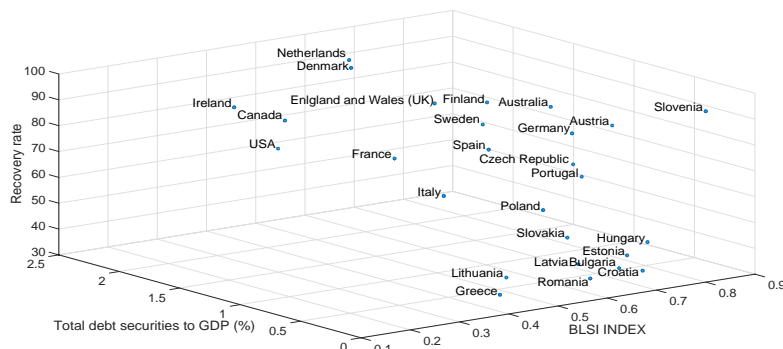
$$\begin{aligned}
& \text{Recovery rate (cents on the dollar)} \\
&= 0.181718 * \text{BLSI INDEX} \\
&+ (5.558e - 016) \\
&+ 0.12255 * \text{Domestic credit to private sector (\% of GDP)} \\
&+ (3.521e - 016) \\
&+ 0.023878 * \text{Stock market capitalization to GDP (\%)} \quad (3) \\
&+ (7.826e - 016) \\
&+ 0.479672 * \text{Total debt securities to GDP (\%)} \\
&+ (1.808e - 016) \\
&+ 0.185253 * \text{Judicial Effectiveness} + 0.272893 \\
&+ (1.551e - 016) + (1.570e - 016)
\end{aligned}$$

According to the estimated model (II), the impact of total debt securities to GDP issued by the financial and non-financial sector on the recovery rate is 2.64 times higher than that of BLSI; 3.91 times higher than the impact of domestic credit on the private sector as % of GDP; 20.09 times higher than the impact of the stock market capitalization to GDP and 2.59 times higher than the impact of the Judicial Effectiveness variable. The impact of BLSI is 1.48 times greater than domestic credit to the private sector; 7.61 times greater than stock market capitalization is GDP, and roughly the same as the impact of Judicial Effectiveness (0.98). The impact of domestic credit on the private sector is 5.13 times greater than stock market capitalization to GDP. The impact of Judicial Effectiveness is 1.51 times greater than that of domestic credit to the private sector and 7.76 times greater than that of stock market capitalization to GDP.

What is important is that all coefficients are positive in the model, so an increase in the value of individual variables has a positive impact on the value of the dependent variable. The coefficient of determination for both models (I) and (II), according to the described normalization rule, is the same and amounts to 64% (0.6363788). After the estimation, a diagnosis of the models was carried out due to the residuals' distribution. Particularly in model II, this model must have good predictive properties if the inputs coincide with the output range of the variables used to estimate it. If the desire to use the model for a variable outside this range (e.g., extremely high total debt to GDP at level 10), it may not work properly. It may happen that the relationship between the variables described in the model is not the same outside the initial data range.

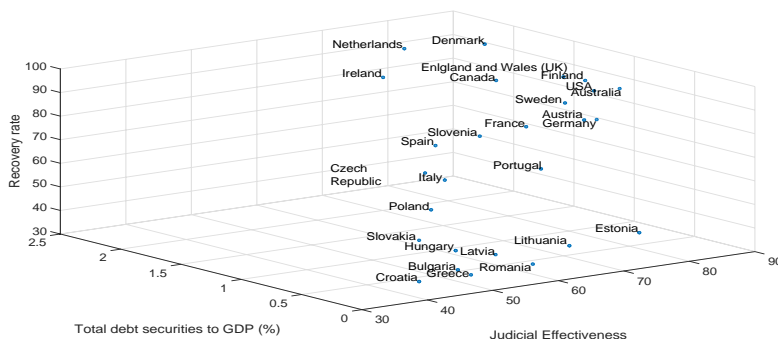
To present the results obtained in more detail, the main dependencies of both models are presented in Figures 3 and 4. The relationship between the two main model factors (I), the BLSI and the value of debt instruments issued by the financial and non-financial sector to GDP, and the dependent variable (recovery rate) is presented in Figure 3. On the other hand, Figure 4 shows the relationship between the Judicial Effectiveness variable and the value of debt instruments issued by the financial and non-financial sector to GDP and the dependent variable (recovery rate). The selection of variables was dictated by their significance in the models (I and II) and the impact on the dependent variable in the model (II).

Figure 3. Relationship between BLSI, value of debt instruments issued to GDP and recovery rate ($X = \text{BLSI}$, $Y = \text{Total debt securities to GDP}$, $Z = \text{Recovery Rate}$)



Source: Own study.

Figure 4. Relationship between the Judicial Effectiveness index, the value of debt instruments issued to GDP and the recovery rate ($X = \text{Judicial Effectiveness}$, $Y = \text{Total debt securities to GDP}$, $Z = \text{Recovery Rate}$)



Source: Own study.

The data presented in Figure 3 confirm the estimation of the model (II), where the impact of the BLSI and the value of issued debt instruments on the recovery rate is positive. This means that the more severe the bankruptcy law towards debtors and the higher the debt instruments' value, the higher the recovery rate can be expected. This is confirmed by both countries with low recovery rates (Greece and Lithuania) and relatively high recovery rates (Finland and Germany). However, it is worth noting three of the analyzed countries (USA, Canada, and Ireland), for which the value of debt instruments issued, and the recovery rate are among the highest in the analyzed group, despite one of the lowest values of the BLSI index (friendliness of bankruptcy law towards debtors). The USA, Ireland, and Canada outside Quebec's province are countries with a common law system and are highly developed. This may mean no single relationship pathway between recovery rates and financial market development or the BLSI index. This can be influenced by, for example, economic development, the legal system, or the organization of financial markets. Comparison of the data

presented in Figures 3 and 4, where the variables analyzed was Judicial Effectiveness, the value of the debt instruments issued to GDP, and the recovery rate, enables confirmation of the overall positive relationship between variables. The relationship itself is stronger than that shown in Figure 4 based on the BLSI in Figure 3, due to the smaller distances between the countries in the chart. Figure 4 also allows us to confirm the estimates of the model (II).

5. Conclusions

Based on the conducted research, including the two-panel models developed, it was possible to confirm the research hypothesis set out in the introduction – regarding the existence of a statistical relationship between the effectiveness of bankruptcy systems (measured by the recovery rate) and factors characterizing the level of development of the financial market as well as the severity of bankruptcy law towards debtors and the effectiveness of the judicial system. All independent variables included in the model positively affected the dependent variable – the recovery rate. Detailed conclusions are as follows:

- 1) The effectiveness of bankruptcy systems as measured by the recovery rate is higher in countries where bankruptcy law is more creditor-friendly (more severe towards debtors), and at the same time, there is an effective legal system.
- 2) The effectiveness of bankruptcy regimes is an essential element emphasized in countries with a high level of development of the debt market. The level of development of the stock market has a significantly lower impact.

However, there are exceptions to the rule confirmed statistically in item 1, i.e., there are countries such as Canada, the USA, or Ireland with debtor-friendly bankruptcy laws and high recovery rates simultaneously. This may be due to the following: the type of the legal system (statutory law vs. common law) and its origin, the form of organization of the financial market and at the same time the banking system model (the Anglo-Saxon and continental models), the effectiveness of conducted restructuring measures, the level of development of countries. The analysis of these factors in the context of the effectiveness of bankruptcy systems is another research challenge to be faced by the authors of this article.

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